July 31, 2012

TO: Erika Lacro, Chancellor
    Honolulu Community College

SUBJECT: Career & Technical Education Award

Honolulu Community College is awarded $31,427 in 2012-2013 Title I Career and Technical Education funds to support the entitled project:

    SketchUp: the Next Generation CAD $31,427

The award period for the project is from July 1, 2012 to June 30, 2013 and the award number for the project is: HON2012/13(1)-T1-01 and should be referenced on all future correspondence and reports. These funds must be expended and goods received by June 30, 2013. A completion report is due on October 10, 2013.

Please call Dominic (Nic) Estrella at 956-3865 if you have questions.

Sincerely,

[Signature]

Peter Quigley
Assoc. Vice President for Academic Affairs

Cc: B. Furuto, VCAS
    R. Uyeno, CTE Dean
    K. Chock, CTE Dean
    D. Inafuku, FA
    L. Tshahoko, FA
    S. Robinson, Dir. of Academic Programs
CARL D. PERKINS VOCATIONAL AND TECHNICAL
EDUCATION ACT OF 2006
Perkins IV Intervention Strategy Proposal Form
(revised January 2012)

Strategy # 1
Program Year 2012-13

1. College: Honolulu Community College

2. (Descriptive) Strategy Title: SketchUp: the Next Generation CAD

3. Proposer's Name: Norman Takeya  E-Mail: ntakeya@hawaii.edu
   Michael Jennings  E-Mail: mjennings@hawaii.edu

   Is this proposal a part of a multiple-year strategy? Yes
   If this is a multiple-year strategy, for what year is this proposal requesting funding?
   Year 1

5. Brief Statement of identified problem area and reason for selection:
   a) Provide relevant program and/or college data to support the need to address this
      problem.)
   b) Describe alignment of problem to one or more Perkins Core Indicators, and as
      appropriate, goals from the UHCC Strategic Plan, Achieving the Dream, and/or other
      UHCC projects. (See pg. 2 of Instructions)
   c) Include narrative that is supported by data. Be brief and succinct.

   a. Current drafting positions in architecture and engineering companies require the use of
      Computer-Aided Design (CAD) software. Traditional CAD programs are characterized by
      a steep learning curve and high cost, limiting the average community college student's
      access to the technology (requiring significant time in labs that control software due to
      license restrictions). The construction industry is currently dependent on drafting
      software such as AutoCAD, a new form of application known as Building Information
      Modeling (BIM) software such as Revit, and 3D Modeling software such as 3D Studio
      Max. While student versions of this software are available to students at no or little cost,
      the commercial versions (which the college is required to purchase) cost several
      thousands of dollars. The SketchUp software in this proposal is free in its most basic
      form and $495 for the Pro version. The Pro version is available to faculty for free and to
      school labs for about $15 a seat. The free version is the primary software in this
      proposal.

      Sketchup is a product of Google, and is widely used by architects, engineers and
      designers of all kinds of products for quick, accurate 3D conceptual drawings, renderings
      and technical illustrations. Users of SketchUp have pushed the envelope of this software
      now to a point that it is used for much more advanced purposes than simple
      conceptualization, including such high-end uses as construction process modeling. For
      example, this software is currently being used by the contractor on the World Trade
      Center. Architect Dennis Sakai of Florida has documented this high-end use of
SketchUp in a series of books published by his company, Insitebuilders. (Please visit www.insitebuilders.com for more information.) This proposal opens accessibility to software that, with proper training, can be utilized as effectively as any of the expensive programs mentioned above. By developing classes or even learning units for Sketchup, students from many diverse backgrounds will be able to receive a high quality, up-to-date curriculum designed to meet industry needs. In addition, the skills to be taught will integrate academic concepts with technical competencies, providing the connection from conceptual to contextual learning. The skills taught will offer the requisite aptitudes for job placement, advancement, security, and portability in fields such as architecture, engineering and product design.

The courses and/or units and lessons developed will be used primarily for the Architectural, Engineering, and CAD Technologies (AEC) and new Construction Management (CM, approved as a provisional A.S. program on March 15, 2012) programs, but may also be used in apprenticeship training. They may also be used as and developed for non-credit career and technical education programs for adults to upgrade skills or to prepare unskilled or displaced workers for the workforce as the concepts used by SketchUp are of direct value in the construction industry and are largely translatable or transferrable to any CAD software.

Sketchup has Rapid Manufacturing (3D Printing) capabilities and this technology can now be taught with software that has a low learning curve. Students can now be exposed to 3D printing via new compact portable 3D printing devices that cost a fraction of printers available only a couple of years ago.

An Occupational Employment Statistics Survey indicated employment of CAD operators is expected to grow by 4 percent between 2008 and 2018, which is slower than the average for all occupations. However, growth will vary by specially.

The SketchUp program is owned by Google, and has millions of users worldwide. Some of the industries served by the software are listed in the table below:

<table>
<thead>
<tr>
<th>Field</th>
<th>Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architecture &amp; Design</td>
<td>76</td>
<td>36%</td>
</tr>
<tr>
<td>Engineering</td>
<td>19</td>
<td>09%</td>
</tr>
<tr>
<td>Construction</td>
<td>38</td>
<td>18%</td>
</tr>
<tr>
<td>Digital Entertainment</td>
<td>05</td>
<td>02%</td>
</tr>
<tr>
<td>Education</td>
<td>10</td>
<td>05%</td>
</tr>
<tr>
<td>Aviation</td>
<td>03</td>
<td>01%</td>
</tr>
<tr>
<td>Personal</td>
<td>31</td>
<td>15%</td>
</tr>
</tbody>
</table>

b. The CM program is new and therefore no Perkins data is available yet for the program. For the AEC program, the most recent Perkins data on performance can be seen in this table:
Our proposed project is aligned with the following indicators:

- Perkins Core Standards 1P1 and 4P1
- UHCC Performance Measure 3 (STEM)
- UHCC Perkins Priority c

Alignment is explained in the following tables.

<table>
<thead>
<tr>
<th>Perkins Core Measure</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>☒ 1P1 Technical Skills Attainment</td>
<td>Students will be learning software that is being adopted by greater numbers of firms in the industry. SketchUp is software that is currently in version 8 and is being used in the construction industry. In addition, the skills learned for this software are readily transferable to other software packages.</td>
</tr>
<tr>
<td>☒ 4P1 Student Placement</td>
<td>Skills attained will enable the student to obtain a high skill, high wage placement in the construction industry. According to a 2011 survey by the Autodesk Users Group International (AUGI), the average salary for draftspersons in the Pacific region of the United States is $50,761 ($24.40 per hour).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UHCC Performance Measure</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>☒ Number of STEM degrees and certificates (CA) awarded</td>
<td>AEC is designated as a STEM field, and by increasing accessibility of CAD software to students it is expected that completion rates will increase.</td>
</tr>
<tr>
<td>☒ Number of transfers to UH system 4-year</td>
<td>In 2010-11, roughly 10 percent of majors transferred to UH 4-year colleges (12 out of 113). This represented a 33% increase from the previous year, and it is expected that adding SketchUp to the students' experience will sustain this trend of transfers, given the increasing use of the software among architectural and engineering firms.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UHCC Perkins Priorities</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>☒ c. The project links secondary and postsecondary and promotes Hawaii's Career Pathways;</td>
<td>&quot;Train the trainer&quot; modules will be developed and offered to DOE teachers to introduce this software to K-12 students. (An AEC faculty member recently was invited to work with an elementary school class to introduce them to this software.) It is expected that the ease with which this software can be</td>
</tr>
</tbody>
</table>
6. **Brief Strategy Description:** (Typically no more than one or two paragraphs)

The objectives of this project are as follows:

1. Develop and deliver a 3 credit elective course for AEC and CM.
2. Develop and deliver a non-credit course for those already in the workforce.
3. Develop and deliver "train the trainer" training for faculty from Neighbor Island community colleges and the State Department of Education, including purchase and distribution of 3D printing units for the Neighbor Island CC campuses.
4. Develop short units or lessons for various trades programs as well as apprenticeship to expose their students to Sketchup.
5. Develop 3D Rapid Manufacturing capabilities using 3D printers.

In order to achieve these objectives, Perkins funds will be used for the following purposes:

- Noninstructional summer overload for AEC/CM faculty for development of courses and training units, as follows:
  - July-Aug 2012 (6 weeks) x 19 hrs/wk x $50.89/hr = $5,801.46

- Student assistant to provide lab support, as follows:
  - One assistant @ $9.45/hour x 20 hrs/wk x 25 weeks = $4,725

- Purchase 3D printers to produce designs created with the SketchUp software for training, as follows:
  - 5 printers @ $3550 each = $17,750 + $2,250 est shipping = $20,000

- Travel costs for 3 Neighbor Island faculty to visit HonCC for training sessions.

7. **Calendar of Planned Activities:** (add or delete rows as appropriate)

In chronological order, briefly describe the procedures/activities planned to achieve stated goal(s) or outcome(s)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Month(s) the Activity will take place</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop credit course and training modules</td>
<td>7/12 – 12/12</td>
</tr>
<tr>
<td>Purchase 3D printers</td>
<td>10/12</td>
</tr>
<tr>
<td>Deliver AEC/CM course</td>
<td>1/12-5/12</td>
</tr>
<tr>
<td>Deliver noncredit courses for industry</td>
<td>2/13</td>
</tr>
<tr>
<td>Deliver Neighbor Island faculty training sessions</td>
<td>3/13</td>
</tr>
<tr>
<td>Deliver DOE faculty training sessions</td>
<td>6/13</td>
</tr>
</tbody>
</table>
8. Effectiveness Measures:

Measureable outcomes of this project to be used to evaluate its effectiveness include the following:

1. On-time delivery of 3-credit AEC/CM course
2. On-time delivery of non-credit training course for industry
3. Working draft of an agreement between HonCC and the DOE for a course based on SketchUp
4. Development of various units and or lessons for on-demand delivery to Apprenticeship, trades, etc.
5. On-time delivery of a faculty development workshops to teach SketchUp for community colleges receiving 3D printers.

For each course and workshop learning objectives will be created such that upon completion of the training, students will be able to demonstrate that they can use the software to create a well-organized, cohesive 3D model. The student will learn to present various views of the model including plan, elevations, sections and perspectives. For training that includes 3D printing, students will be able to use the software to create the model as mentioned above and verify that the model is “watertight” and without errors such that it can be printed with a 3D printer, and that the model is exported in a format that is used by the 3D printer such as the .STL (Stereolith) format. The students will also create a physical 3D printed model.

9. Budget Summary: For system projects, the budget must include a breakdown of costs by campus along with a total system budget. (Double-click to access Excel Worksheet).
<table>
<thead>
<tr>
<th>Personnel (List all positions separately)</th>
<th>Budget</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEC faculty member (noninstructional overload)</td>
<td>$ 5,802</td>
<td>Casual Hire/Overload</td>
</tr>
<tr>
<td>Student Assistant</td>
<td>$ 4,725</td>
<td>Student</td>
</tr>
</tbody>
</table>

Personnel Subtotal: $ 10,527

Fringe Benefits (List per position)

<table>
<thead>
<tr>
<th>Fringe Benefits</th>
<th>Budget</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEC faculty member (noninstructional overload)</td>
<td>$ 126</td>
<td>Casual Hire/Overload</td>
</tr>
</tbody>
</table>

Student Assistant | $ 25 | Student |

Fringe Total: $ 150

Personnel Subtotal: $ 10,677

Services

Material & Supplies

Travel (3 faculty x $250/trip) | $ 750 |

Rentals

Other

Equipment 3-D Printers $3,550.00 Each X 5 + Est Shipping | $ 20,000 |

TOTAL COSTS: $ 31,427

Fringe Benefit Rates (as of 7/15/11)

<table>
<thead>
<tr>
<th>Category</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty/Staff</td>
<td>40.25%</td>
</tr>
<tr>
<td>Casual Hire/Overload</td>
<td>2.17%</td>
</tr>
<tr>
<td>Student</td>
<td>0.52%</td>
</tr>
</tbody>
</table>
10. Certifications:
I certify that this proposal, budget, and certifications are accurate and complete and that this project will be conducted in accordance to Perkins policies and Federal, State, and University regulations and requirements.

I also certify that I have consulted with the appropriate Institutional Research, Business Office and Human Resources Office personnel and that they have reviewed all budgets and resource commitments and have found that they comply with Perkins, Federal, State, and University requirements and policies.

Proposer’s Signature: [Signature] Date: 8/20/12

Print name: [Print name]